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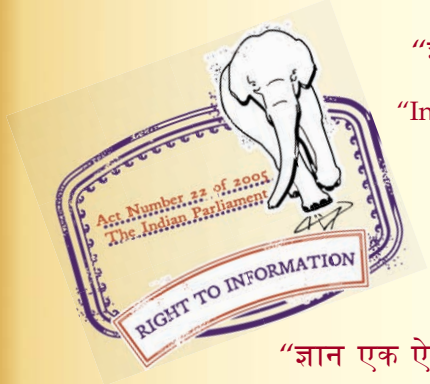
IS 8937 (1978): Aluminium alloy wire for cold forged rivets for aircraft purposes (Alloy 22500) [MTD 7: Light Metals and their Alloys]



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"Knowledge is such a treasure which cannot be stolen"

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IS : 8937 - 1978
(Reaffirmed 1999)

Indian Standard

SPECIFICATION FOR ALUMINIUM-ALLOY WIRE FOR COLD FORGED RIVETS FOR AIRCRAFT PURPOSES (ALLOY 22500)

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SPECIFICATION FOR ALUMINIUM-ALLOY WIRE FOR COLD FORGED RIVETS FOR AIRCRAFT PURPOSES (ALLOY 22500)

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(*Continued on page* 7)

Indian Standard

SPECIFICATION FOR ALUMINIUM-ALLOY WIRE FOR COLD FORGED RIVETS FOR AIRCRAFT PURPOSES (ALLOY 22500)

0. FOREWORD

0.1 This Indian Standard was adopted by the Indian Standards Institution on 25 September 1978, after the draft finalized by the Light Metals and Their Alloys Sectional Committee had been approved by the Structural and Metals Division Council.

0.2 This standard has been prepared to cover the requirements of aluminium-copper-magnesium alloy wire used for manufacturing rivets for aircraft purposes. In the preparation of this standard, assistance has been derived from the following publication :

BS : 3L86 Specification for wire for solid-cold-forged rivets of aluminium-copper-magnesium alloy. British standards Institution.

MIL-W-7986 Wire and rod, aluminium and aluminium alloy for die heading. US Federal Specification.

AMTY 498-7-63 Aluminium wire. State Committee of Aviation Technology of USSR.

0.3 This standard is one of a series of Indian Standards on aluminium and aluminium alloy wires for cold forged rivets for aircraft purposes. Other standards in this series are :

IS : 8513-1977 Aluminium-alloy wire for cold forged rivets for aircraft purposes (alloy 55000)

IS : 8514-1977 Aluminium-alloy wire for cold forged rivets for aircraft purposes (alloy 24530)

IS : 8515-1977 Aluminium wire for cold forged solid rivets for aircraft purposes (alloy 19500)

IS : 8936-1978 Aluminium-alloy wire for cold forged rivets for aircraft purposes (alloy 24350)

IS : 8938-1978 Aluminium-alloy wire for cold forged rivets for aircraft purposes (alloy 24345)

0.4 With the publication of separate standards for individual alloy wires for manufacturing cold forged rivets, IS : 5902-1970* will be withdrawn.

0.5 For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test or analysis, shall be rounded off in accordance with IS : 2-1960†. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

1. SCOPE

1.1 This standard covers the requirements of aluminium-copper-magnesium alloy wire used for cold forging of rivets for aircraft purposes.

2. INSPECTION AND TESTING PROCEDURES

2.1 This standard shall be used in conjunction with IS : 8474-1977‡.

3. MATERIAL

3.1 The material shall be made from aluminium and alloying constituents with or without approved scrap at the discretion of the manufacturer and shall conform to the chemical composition specified in **5.1**. The wire shall be drawn from extruded or hot rolled stock.

4. FREEDOM FROM DEFECTS

4.1 The drawn wire shall be free from harmful defects, such as deep die marks and scratches, seams, ovality, transverse surface cracks, corrosion patches and pits, blisters and coarse grained surface.

5. CHEMICAL COMPOSITION

*Aluminium and aluminium alloy rivet stock for cold forged rivets for aircraft purposes.

†Rules for rounding off numerical values (*revised*).

‡Procedure inspection and testing of aluminium and aluminium alloy wires (for rivets) for aircraft purposes.

5.1 Chemical composition of each cast, when analysed in accordance with IS : 504-1963*, shall be as follows :

Element	*Percent*
Copper	2·0 to 3·0
Magnesium	0·2 to 0·5
Silicon	0·7 *Max*
Iron	0·5 ,,
Manganese	0·2 ,,
†Nickel	0·05 ,,
†Zinc	0·2 ,,
†Lead	0·05 ,,
†Tin	0·05 ,,
†Titanium + Zirconium	0·2 ,,
†Chromium	0·1 ,,
Aluminium	Remainder

6. CONDITION

6.1 The wire shall be supplied annealed and subsequently cold drawn to secure a reduction in cross-sectional area of not less than 20 percent nor more than 40 percent.

7. HEAT TREATMENT

7.1 Test samples shall be heat-treated as follows :

a) Solutionise at 495 ± 5°C and quench in cold water below 40°C.

b) Age at room temperature for not less than 96 hours.

8. MECHANICAL PROPERTIES

8.1 Tensile Strength — Tensile strength of test specimen selected and prepared in accordance with IS : 8474-1977‡ shall be not less than 290 MPa (29·6 kg/mm^2).

NOTE — For the guidance of the designer it may be mentioned here that the minimum shear strength is expected to be 185 MPa (19 kgf/mm^2).

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*Methods of chemical analysis of aluminium and its alloys (*revised*).

†Subject to the discretion of the inspecting authority, determination of these elements need be made on a small proportion only of the samples analysed.

‡Procedure for inspection and testing of aluminium and aluminium alloy wires (for rivets) for aircraft purposes.

8.2 Upsetting Test

8.2.1 Upsetting test shall be carried out in accordance with IS : 8474-1977* on one wire test specimen from each coil in the lot in the as-supplied condition, and also solutionised condition within 20 minutes of solution treatment. The test pieces shall not reveal any defect on completion of the test.

8.2.2 The height of projecting portion of the sample, subjected to upsetting test shall be as follows :

Diameter, mm *d*	*In As Supplied Condition*	*In Heat-Treated Condition*
(1)	(2)	(3)
1·4 up to and including 4·5	1·5 *d*	1·5 *d*
Over 4·5 up to and including 9·0	1·5 *d*	1·4 *d*

9. TOLERANCES ON DIAMETER

9.1 Tolerances on diameter of the wire shall be in accordance with IS : 8474-1977*.

10. CORROSION PREVENTION

10.1 All coils shall be adequately protected against corrosion by any suitable temporary coating, such as neutral grease or oil, and packed in waterproof paper and secured properly.

11. IDENTIFICATION

11.1 Each coil, passed by the inspector, shall be tagged with a metal label bearing the mark of the inspector and such other marking as shall ensure full identification of the material.

11.2 Each coil of wire shall be colour coded in accordance with IS : 2479-1969† to the satisfaction of the Inspecting Authority.

12. CERTIFICATION

12.1 All supplies shall be accompanied by certificates for freedom from defects, chemical composition, condition and mechanical properties, as laid down in **4**, **5**, **6** and **8** respectively or as required by the Inspecting Authority.

12.2 The manufacturer shall, when required, supply free of charge a copy of the works analysis of the material. Works analysis is defined as the routine analysis conducted by the manufacturer in order to control the quality of the material.

*Procedure for inspection and testing of aluminium and aluminium alloy wires (for rivets) for aircraft purposes.

†Colour code for the identification of aluminium and aluminium alloys for general engineering purposes.

(*Continued from page* 2)

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INDIAN STANDARDS

ON

ALUMINIUM AND ITS ALLOYS FOR AIRCRAFT PURPOSES

IS:

23-1969 Primary (virgin) aluminium notched bars and ingots for remelting for aircraft purposes (*second revision*)

202-1966 Aluminium casting alloy ingots and castings for aircraft purposes (*second revision*)

2304-1962 Procedure for inspection and testing of light metals (aluminium and magnesium) and their alloy, ingots and castings for aircraft purposes

3420-1976 Procedure for inspection and testing of aluminium and aluminium alloys, sheet and strip (for aircraft purposes) (*first revision*)

3435-1968 99 Percent secondary aluminium notched bars and ingots for remelting for aircraft purposes

3436-1966 Aluminium clad aluminium alloy sheet, strip and coil for aircraft purposes

5902-1970 Aluminium and aluminium alloy rivet stock for cold forged rivets for aircraft purposes

7428-1974 Aluminium and aluminium alloys extruded bars, rods and sections (for aircraft purposes)

7429-1974 Procedure for inspection and testing of aluminium and aluminium alloy extruded bars, rods and sections (for aircraft purposes)

7670-1975 Aluminium alloy forging stock and forgings (for parts operated at elevated temperatures) for aircraft purposes (alloy 22588)

7674-1975 Procedure for inspection and testing of aluminium alloys and aluminium alloys forging stock and forgings for aircraft purposes

7882-1975 Aluminium alloy sheet and strip for aircraft purposes (alloy 19000)

7883-1975 Aluminium sheet and strip for aircraft purposes (alloy 31000)

7902-1975 Aluminium alloy forging stock and forgings for aircraft purposes (alloy 24345)

8474-1977 Procedure for inspection and testing of aluminium and aluminium alloy wires (for rivets) for aircraft purposes

8513-1977 Aluminium alloy wire for cold forged rivets for aircraft purposes (alloy 55000)

8514-1977 Aluminium alloy wire for cold forged rivets for aircraft purposes (alloy 24530)

8515-1977 Aluminium wire for cold forged rivets for aircraft purposes (alloy 19500)

8560-1977 Aluminium clad aluminium alloy sheet and strip for aircraft purposes (alloy 24530)

8561-1977 Aluminium alloy clad sheet and strip for aircraft purposes (alloy 76528)